

(12)

- (54) A line pan for a scraper chain conveyor**

return run 3 in operational width and is formed as a mirror image thereof with respect to the deck plate 4. In the region of upper conveying run 2 the pan sidewalls 1 are formed as side flanges 1Q for the attachment of furnishings 11 on the outer side and secure retention of the wear liner 8 on the inner side. Loss of production shifts in dismantling and re-assembling the furnishings 11 as well as completely replacing a worn line pan is minimised since the replacement work remains restricted to the worn wear liner 8.

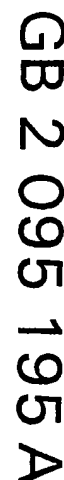


Fig.1

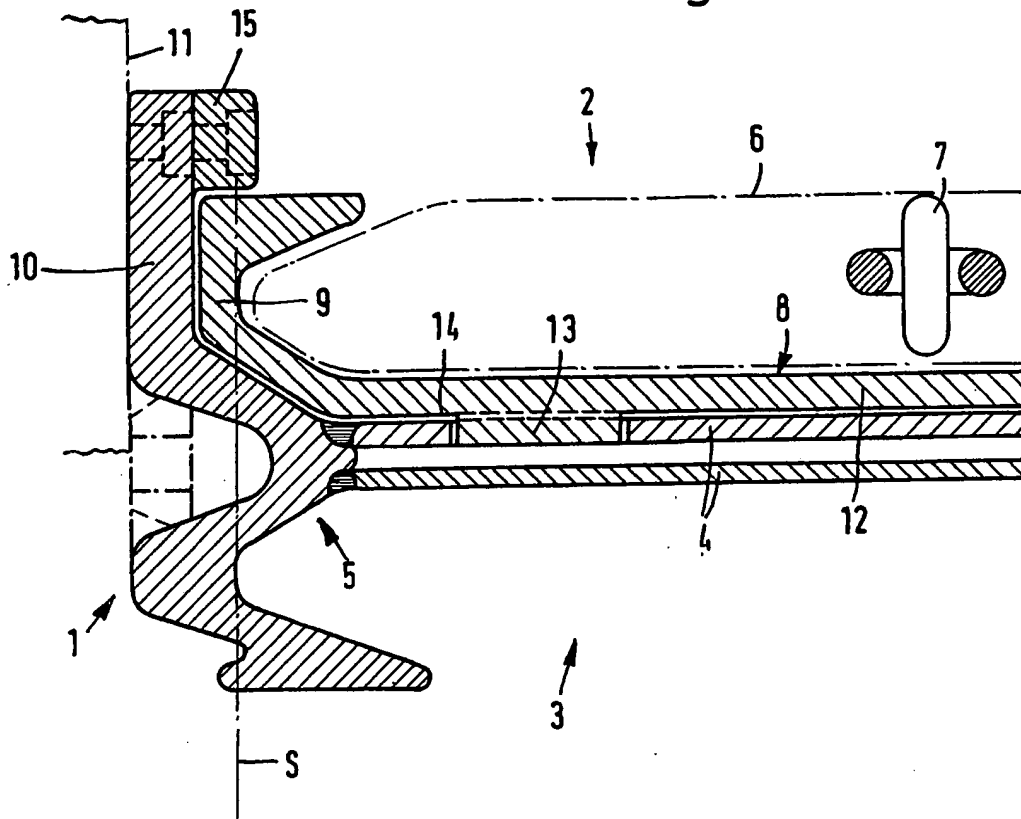


Fig.2

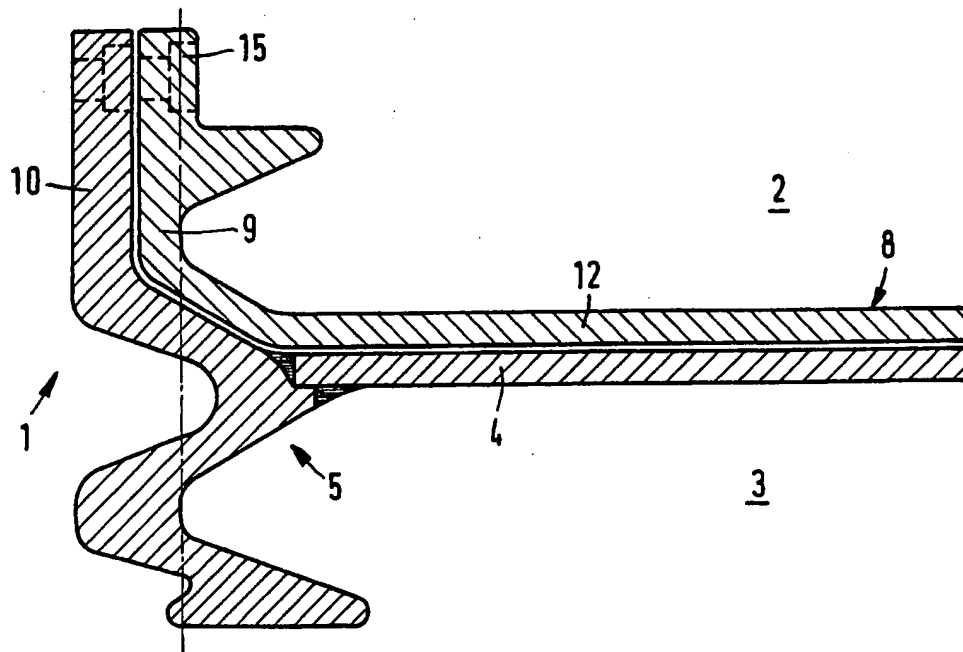


Fig.3

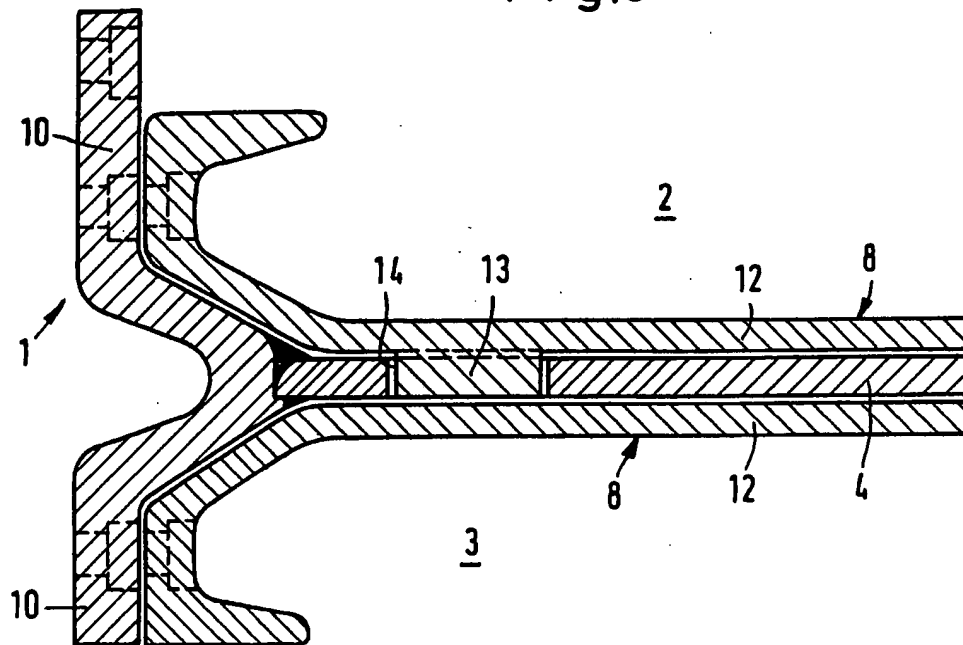
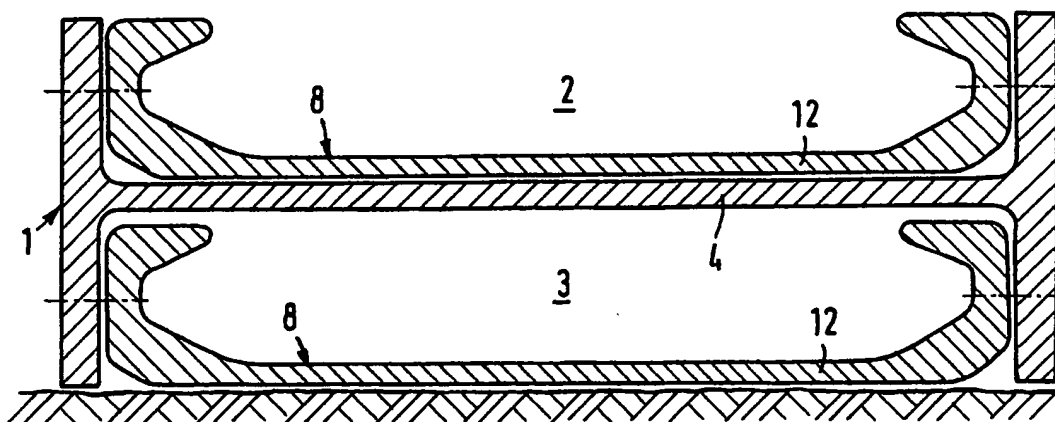


Fig.4



## SPECIFICATION

## A line pan for a scraper chain conveyor

The invention relates to a line pan for a scraper chain conveyor, comprising pan side walls and a deck plate interconnecting the sidewalls and separating an upper conveying run from a lower return run. Such line pans attached together end-to-end are normally used with single-chain or double-chain scraper conveyors, which are chiefly used in underground workings. In conveyors of this kind the flight bars that are fastened to the chain strands circulating in the upper conveying run and the lower return run are guided in the V-profiles of the pan sidewalls that are usually sigma-shaped.

A continual problem with chain conveyors installed in underground workings results from wear of the conveyor or specifically its line pans, and replacement of a worn line pan is then necessary. This replacement involves great difficulties because the attachments between adjacent line pans can only be dismantled at the cost of a considerable amount of time and labour. These attachments on the coal face side of the conveyor are for example ramp plates and guide beams; on the goaf side of the conveyor are spill plates for a mineral winning device such as a shearer, coal plough, or the like. These attachments suffer much less wear than the line pans and consequently can continue to be used after replacement of a worn line pan. Hitherto it has hardly been possible to achieve cutting distances of more than 2000 metres without replacing the conveyor or many of its line pans, i.e. without losing production shifts whilst the worn conveyor is dismantled and re-assembled. The invention is intended to offer a remedy for this.

It is the basic problem of the invention to provide a line pan for a scraper chain conveyor of the above-described kind which, after the normal effects of wear have appeared, makes it unnecessary to lose production shifts in dismantling and reassembling the attachments as well as in completely replacing the worn line pan(s).

According to the present invention, there is provided a line pan for a scraper chain conveyor, comprising pan sidewalls and a deck plate interconnecting the sidewalls and separating an upper conveying run from a lower return run, a replaceable wear liner inserted at least in the upper conveying run, seating on the deck plate and forming profiled liner sidewalls in the upper conveying run, which profiled line sidewalls are aligned with, and match, the profile of the lower return run in operational width, and in the region of the upper conveying run the pan sidewalls are formed with flanges for the attachment of furnishings on their outer side and to secure retention of the wear liner on their inner side.

The result of these features of the invention is that only the wear liner inserted in the upper conveying run is subjected to the normal wear

from the circulating chain strand(s), and the attached flight bars, and the material conveyed. When this wear liner is more or less impaired by wear it can without difficulty be replaced by a new wear liner. This means that the pan sidewalls with the deck plate and the lower return run, which are subjected to much less wear than the upper conveying run, are retained. At the same time the pan sidewalls are so constructed that the necessary attached furnishings such as ramp plates, guide beams, spill plates for shearers or coal ploughs can be attached in the region of the upper conveying run with the wear liner. Loss of production shifts whilst these furnishings are dismantled and re-assembled is no longer necessary, or at least is reduced to the very minimum as replacement of the wear liner no longer requires the furnishings to be removed. In fact according to the teaching of the invention a complete assembly system is achieved which removes the necessity of replacement operations that are otherwise wasteful of time, labour, and expense. The profile of the liner sidewalls is matched to that of the line pan of the lower conveying run, i.e. it is so formed as to be practically identical or a mirror image with respect to the deck plate, so that the flight bars that engage into the profiles are guided without difficulty both in the upper conveying run and in the lower return run. With the line pans according to the invention and the scraper chain conveyor assembled from them, cutting distances in excess of 2000 metres can easily be achieved without losing production shifts in replacing worn line pans, and without the dismantling and re-assembly that is otherwise necessary for replacement of worn line pans. The important advantages achieved by the invention can be seen in this.

Furthermore, a replaceable wear liner can also be inserted in the lower return run, in which the pan sidewalls in the region of the lower return run are then also arranged as side flanges for attachment of furnishings on the outer side and secure retention of the wear liner on the inner side. The covering of the lower return run by a wear liner is particularly advisable when the conveyor is tilted in use, which results in wear on one side of the upper conveying run and the lower return run.

Further preferred features of the invention are as follows. The wear liners for the upper conveying run and lower return run are constructed as identical liners, and consequently can be inserted or replaced indifferently in either the upper conveying run or lower return run. According to the preferred form of construction, the wear liner in the lower return run lies with its liner base against the mine floor and is open towards the deck plate, so that a closed lower return run is formed. The wear liner in the upper conveying run preferably possesses strip-like retaining projections at its ends and by means of these retaining projections it engages into corresponding recesses in the deck plate so that

displacement of the wear liner in the direction of the line pan is prevented. Also in accordance with the invention, hold-down strips for the wear liner can be attached, e.g. bolted on, to the side flanges of the upper conveying run so that the wear liner also cannot be displaced upwards. Sideways retention is effected by the side flanges of the pan sidewalls. The hold-down strips can be formed integrally with the pan sidewalls. Basically there is the possibility of using a line pan with a traditional profile in which the pan sidewalls in the region of the upper conveying run are formed as planar side flanges. Preferably however, the pan sidewalls and the deck plate form a supporting frame for reception of the wear liners in the upper conveying run and the lower return run. In this connection, there is the special possibility of using a standard I-shaped girder as supporting frame, so that the pan sidewalls and the deck plate are in practice formed by merely this I-girder in a recumbent position. Should the wear liners inserted in the upper conveying run and lower return run be themselves inadequate to provide sufficient stability to this line pan, the deck plate can in addition be constructed of double thickness to increase the section modulus of the line pan and thereby particularly to increase its torsional stiffness when wear liners are more or less loosely inserted. The invention also includes a scraper chain conveyor comprising line pans as defined above.

The invention will now be further described, by way of examples, with reference to the accompanying drawings, in which:—

Figure 1 is a partially schematic vertical cross-section through one side of a first embodiment of line pan in accordance with the invention with a wear liner, a separate hold-down strip and a double deck plate;

Figure 2 corresponds to Figure 1 but shows a second embodiment having an integral hold-down strip and a single deck plate;

Figure 3 corresponds to Figure 1 but shows a third embodiment having a wear liner in the lower return run, the latter being upwardly open; and

Figure 4 is a vertical cross-section through a fourth embodiment of the line pan in accordance with the invention, having an I-girder forming a frame, and a wear liner in the lower return run, the latter being closed.

In the drawings there is shown a line pan for a scraper chain conveyor, comprising pan sidewalls 1 and a deck plate 4 interconnecting the pan sidewalls 1 and separating an upper conveying run 2 from a lower return run 3. Such line pans are assembled end-to-end to form a single-chain or double-chain scraper conveyor of required length. Their sidewalls 1 conventionally have a sigma section profile 5. Thereby V-shaped profile recesses occur in both the upper conveying run 2 and lower return run 3 for the guidance of flight bars 6 on a chain strand 7 circulating in the upper conveying run 2 and the lower return run 3, one flight bar 6 and one centrally-positioned chain strand 7 for a single chain conveyor being

indicated in the upper conveying run 2 of Figure 1.

A wear liner 8 seating on the deck plate 4 is replaceably inserted at least in the upper conveying run 2, forming liner sidewalls 9 with a V-shaped profile. The V-shaped profile of the liner sidewalls 9 is aligned with profile 5 in the lower return run 3 in operational width, which is indicated by a vertical alignment line S. The V-shaped profile of the liner sidewalls 9 is formed as a mirror image of the profile 5 of the lower return run 3 with respect to the deck plate 4. Such a construction is necessary to ensure free circulation of the flight bars 6. In the region of upper conveying run 2, the pan sidewalls 1 are formed with planar side flanges 10 in the embodiment of Figure 1 for the attachment of furnishings 11 on the outer side of the flanges 10 and to secure retention of the wear liner 8 on the inner side.

As indicated in the embodiment of Figure 3, a replaceable wear liner 8 can also be inserted in the lower return run 3. In this case the pan sidewalls 1 are also formed with planar side flanges 10 in the region of lower return run 3 for the attachment of furnishings 11 on the outer side and secure retention of the wear liner 8 on the inner side. Wear liners 8 for the upper conveying run 2 and for the lower return run 3 are constructed as identical liners. The wear liner 8 in lower return run 3 can lie with its liner base 12 against the deck plate 4 and be open towards the mine floor. The possibility however also exists that the wear liner 8 may lie with its liner base 12 against the mine floor and be open towards the deck plate 4. A closed lower return run 3 is then formed. The wear liner 8 in the upper conveying run 2 possesses strip-like retaining projections 13 at its ends and by means of these retaining projections it engages into corresponding recesses 14 in the deck plate 4. This precludes independent displacement of wear liner 8 in the direction of the line pan. Displacement upwards is prevented in the embodiment of Figure 4 because hold-down strips 15 for the wear liner 8 can be attached to the flanges 10, e.g. by bolts. Alternatively, these hold-down strips 15 can be formed integrally with the liner sidewalls 9, as indicated in the embodiment of Figure 2. The pan sidewalls 1 and the deck plate 4 merely provide a supporting frame for reception of the wear liners 8 in upper conveying run 2 and lower return run 3. A complete assembly system with an extremely simple form of construction is achieved if, as indicated in the embodiment of Figure 4, the pan sidewalls 1 and the deck plate 4 are formed by a recumbent I-girder and, as already mentioned, the wear liners 8 for the upper conveying run 2 and the lower return run 3 are identically shaped. The deck plate 4 can be formed as a double deck with ends spread apart to increase the stability and particularly the torsional stiffness.

#### Claims

1. A line pan for a scraper chain conveyor,

- comprising pan sidewalls and a deck plate interconnecting the sidewalls and separating an upper conveying run from a lower return run, with a replaceable wear liner inserted at least in the
- 5 upper conveying run, seating on the deck plate and forming profiled liner sidewalls in the upper conveying run, which profiled liner sidewalls are aligned with, and match, the profile
- 10 of the lower return run in operational width, and in the region of the upper conveying run the pan sidewalls are formed with flanges for the attachment of furnishings on their outer side and to secure retention of the wear liner on their inner side.
- 15 2. A line pan as claimed in Claim 1, wherein a replaceable wear liner is also inserted in the lower return run, and the pan sidewalls in the region of the lower return run are arranged as side flanges for the attachment of furnishings on the outer side
- 20 and secure retention of the wear liner on the inner side.
- 25 3. A line pan as claimed in any preceding Claim, wherein the wear liners for the upper conveying run and the lower return run are constructed as identical liners.
- 30 4. A line pan as claimed in any preceding Claim, wherein the wear liner in the lower return run is adapted to lie with its base against a mine floor and is open towards the deck plate and thereby forms a closed lower return run.
- 35 5. A line pan as claimed in any preceding Claim, wherein the wear liner in the upper conveying run possesses strip-like projections at its ends and by means of these engages into corresponding recesses in the deck plate.
6. A line pan as claimed in any preceding Claim, wherein hold-down strips for the wear liner are attached to side flanges of the upper
- conveying run.
- 40 7. A line pan as claimed in any one of Claims 1 to 5, wherein the hold-down strips are formed integrally with the liner sidewalls.
8. A line pan as claimed in any preceding Claim, wherein the pan sidewalls and the deck
- 45 plate form a supporting frame for the reception of the wear liners in the upper conveying run and the lower return run.
9. A line pan as claimed in any preceding Claim, wherein the pan sidewalls and the deck plate are formed by a recumbent I-girder.
- 50 10. A line pan as claimed in any preceding Claim, wherein the deck plate is formed as a double deck with ends spread apart.
11. A line pan as claimed in any preceding
- 55 Claim, wherein the profile of the liner sidewalls is a mirror image of the profile of the lower return run, with respect to the deck plate.
12. A line pan for a scraper chain conveyor substantially as hereinbefore described with reference to Figure 1 of the accompanying
- 60 drawings.
13. A line pan for a scraper chain conveyor substantially as hereinbefore described with reference to Figure 2 of the accompanying
- 65 drawings.
14. A line pan for a scraper chain conveyor substantially as hereinbefore described with reference to Figure 3 of the accompanying
- 70 drawings.
15. A line pan for a scraper chain conveyor substantially as hereinbefore described with reference to Figure 4 of the accompanying
- 75 drawings.
16. A scraper chain conveyor comprising line pans as defined in any preceding Claim.